

Claims

1. A ball bearing with double raceway, which rotatably supports a pinion shaft having a pinion gear on one end thereof
5 in an axial direction, comprising:

an outer ring member having a large-diameter raceway surface and a small-diameter raceway surface that are spaced from each other in the axial direction;

10 an inner ring member having a large-diameter raceway surface and a small-diameter raceway surface that are spaced from each other in the axial direction so as to be respectively positioned inside the large-diameter raceway surface and the small-diameter raceway surface in a radial direction;

15 a large-diameter-side row of balls that are interpolated between the two large-diameter raceway surfaces;

a small-diameter-side row of balls that are interpolated between the two small-diameter raceway surfaces,

20 wherein internal clearances on the two large-diameter raceway surfaces side as well as on the two small-diameter raceway surfaces side are designed to have respectively different sizes in such a manner that upon applying a load on the pinion shaft, the row of balls on the anti-pinion gear side of the two rows of balls is subjected to the load prior to the row of balls on the pinion gear side.

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2. The ball bearing with double raceway according to claim 1, wherein a radial internal clearance on the anti-pinion gear side is made smaller than a radial internal clearance on the pinion gear side.

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3. The ball bearing with double raceway according to claim 1, wherein an axial internal clearance on the anti-pinion gear side is made smaller than an axial internal clearance on the

pinion gear side.

4. The ball bearing with double raceway according to claim 1, wherein balls that respectively constitute the row of balls on the pinion gear side and the row of balls on the anti-pinion gear side have virtually the same diameter so that the row of balls on the pinion gear side have a pitch circle diameter greater than the pitch circle diameter of the row of balls on the anti-pinion gear side.

5. A pinion-shaft-supporting bearing device comprising:
a plurality of rolling bearings that support a pinion shaft having a pinion gear at one end in an axial direction at predetermined positions on the pinion gear side and the anti-pinion gear side,

wherein at least the rolling bearing on the pinion gear side is prepared as a ball bearing with double raceway that comprises: an outer ring member having a large-diameter raceway surface and a small-diameter raceway surface that are placed in a separate manner from each other in the axial direction; an inner ring member having a large-diameter raceway surface and a small-diameter raceway surface that are placed in a separate manner from each other in the axial direction; a large-diameter-side row of balls and a small-diameter-side row of balls that are respectively interpolated between the raceway surfaces of the outer ring member as well as between the raceway surfaces of the inner ring member, the ball bearing with double raceway being arranged so that internal clearances on the two large-diameter raceway surfaces side as well as on the two small-diameter raceway surfaces side are designed to have respectively different sizes in such a manner that upon applying a load on the pinion shaft, the row of balls on the anti-pinion gear side of the two rows of balls is subjected to the load prior

to the row of balls on the pinion gear side.

6. The pinion-shaft-supporting bearing device according to claim 5, wherein the large-diameter-side row of balls are placed on the pinion gear side and the small-diameter-side row of balls are placed on the anti-pinion gear side, and a radial internal clearance on the anti-pinion gear side is made smaller than a radial internal clearance on the pinion gear side.

7. The pinion-shaft-supporting bearing device according to claim 5, wherein the large-diameter-side row of balls are placed on the pinion gear side and the small-diameter-side row of balls are placed on the anti-pinion gear side, and an axial internal clearance on the anti-pinion gear side is made smaller than an axial internal clearance on the pinion gear side.

8. A pinion-shaft-supporting bearing device comprising:
a plurality of rolling bearings that rotatably support a pinion shaft having a pinion gear at one end in an axial direction at predetermined positions on the pinion gear side and the anti-pinion gear side,

wherein the rolling bearing on the pinion gear side is prepared as a ball bearing with double raceway that comprises:
an outer ring member having a large-diameter raceway surface and a small-diameter raceway surface that are spaced from each other in the axial direction; an inner ring member having a large-diameter raceway surface and a small-diameter raceway surface that are spaced from each other in the axial direction; and a large-diameter-side row of balls and a small-diameter-side row of balls that are respectively interpolated between the raceway surfaces of the outer ring members as well as between the raceway surfaces of the inner ring members, and the rolling bearing on the anti-pinion gear side is prepared as a ball bearing

with single raceway that comprises: an outer ring member, an inner ring member and a single row of balls that are interpolated between an outer ring raceway surface formed on the outer ring member and an inner ring raceway surface formed on the inner ring member, the ball bearing with double raceway being arranged so that an internal clearance on the anti-pinion gear side is made smaller than an internal clearance on the pinion gear side in such a manner that upon applying a load on the pinion shaft, the row of balls on the anti-pinion gear side of the two rows of balls is subjected to the load prior to the row of balls on the pinion gear side, the ball bearing with single raceway being arranged so that an internal clearance in the ball bearing with single raceway being made virtually equal to an internal clearance on the anti-pinion side in the ball bearing with double raceway.

9. The pinion-shaft-supporting bearing device according to claim 8, wherein a radial internal clearance on the anti-pinion gear side in the ball bearing with double raceway is made smaller than a radial internal clearance on the pinion gear side, and a radial internal clearance in the ball bearing with single raceway is made virtually equal to a radial internal clearance on the anti-pinion side in the ball bearing with double raceway.

10. The pinion-shaft-supporting bearing device according to claim 8, wherein an axial internal clearance on the anti-pinion gear side in the ball bearing with double raceway is made smaller than an axial internal clearance on the pinion gear side, and an axial internal clearance in the ball bearing with single raceway is made virtually equal to an axial internal clearance on the anti-pinion side in the ball bearing with double raceway.